

What is claimed:

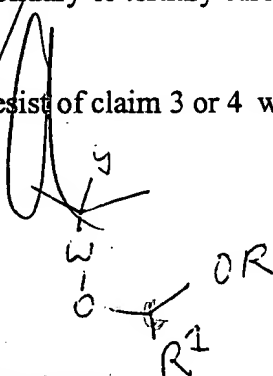
1. A positive photoresist composition comprising a photoactive component and a polymer that comprises 1) groups reactive to crosslinking; and 2) photoacid-labile groups.

2. The photoresist of claim 1 wherein groups 1) comprise acetal groups or ester groups.

3. The photoresist of claim 1 wherein groups 1) comprise acetal groups.

4. The photoresist of claim 3 wherein the acetal group have an oxygen linkage that is substituted by a secondary or tertiary carbon.

5. The photoresist of claim 3 or 4 wherein the polymer comprises units of the following Formula I:



wherein W is a linker group;

R is an optionally substituted cyclic or non-cyclic alkyl group;

R<sup>1</sup> is hydrogen or a cyclic or non-cyclic alkyl group;

Y is hydrogen or optionally substituted alkyl.

6. The photoresist of any one of claims 1 through 5 wherein the polymer comprises phenolic units.

7. The photoresist of any one of claims 1 through 6 wherein the polymer comprises cycloalkyl units.

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8. The photoresist of claim 1 wherein the polymer comprises alkyl acrylate photoacid labile groups.

9. A positive photoresist composition comprising a photoactive component and a component that comprises groups reactive to crosslinking, and a component that comprises photoacid-labile groups.

10. The photoresist of claim 9 wherein the component with crosslinking groups and the component with photoacid-labile groups are a single component of the photoresist.

11. The photoresist of claim 9 wherein the component with crosslinking groups and the component with photoacid-labile groups are separate components of the photoresist.

12. The photoresist of claim 10 or 11 wherein the crosslinking groups are acetal groups.

13. The photoresist of claim 12 wherein the acetal group have an oxygen linkage that is substituted by a secondary or tertiary carbon.

14. The photoresist of any one of claims 1 through 13 wherein the polymer is substantially free of aromatic groups.

15. The photoresist of any one of claims 1 through 14 wherein the photoresist comprises a thermal acid generator compound.

16. The photoresist of any one of claims 1 through 14 wherein the photoresist is free of a thermal acid generator compound.

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17. A method for treating a microelectronic wafer substrate, comprising:
- a) applying a layer of a photoresist composition of any one of claims 1 through 16 on the microelectronic substrate; and
  - b) exposing and developing the photoresist layer on the substrate to yield a developed photoresist layer;
  - c) thermally treating the developed photoresist layer to induce crosslinking of one or more photoresist components.
18. The method of claim 17 wherein the substrate is a microelectronic wafer.
19. The method of claim 17 or 18 wherein the photoresist layer is exposed to patterned radiation having a wavelength of about 248 nm.
20. The method of claim 17 or 18 wherein the photoresist layer is exposed to patterned radiation having a wavelength of less than 200 nm.
21. The method of any one of claims 17 through 20 wherein the thermal treatment induces flow of the developed photoresist layer.
22. The method of any one of claims 17 through 21 wherein the substrate comprises one or more contact holes.
23. The method of claim 22 wherein the photoresist layer flows into the one or more contact holes during the thermal treatment.
24. The method of any one of claims 17 through 23 wherein the photoresist layer is heated after development to at least about 130°C.
25. The method of any one of claims 17 through 23 wherein the photoresist layer is heated after development to at least about 150°C.

26. The method of any one of claims 17 through 23 wherein the photoresist layer is heated after development to at least about 160°C.

27. The method of any one of claims 17 through 26 wherein the photoresist is heated after exposure and prior to development at a temperature of not greater than about 120°C, and the pre-development heating does not cause substantial crosslinking of the photoresist layer.

28. An article of manufacture comprising a substrate having coated thereon a photoresist composition of any one of claims 1 through 16.

29. An article of claim 28 wherein the substrate is a microelectronic wafer.

30. An article of claim 28 wherein the microelectronic wafer comprises one or more contact holes.

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